CROP SCIENCE SOCIETY OF S.A. INCORPORATED

C/- WAITE CAMPUS
P.M.B No 1. GLEN OSMOND. SOUTH AUSTRALIA 5064
ABN: 68 746 893 290

NEWSLETTER No. 324 JUNE, 2019

EDITOR – Judy Rathjen, articles welcome; Ph: 0421183978
email: juditrat@yahoo.com

SECRETARY – Peter Smith
peter@haddrickonfabric.com.au
Ph: 0411 127 478

NEXT MEETING: AGM

Wednesday the 17th of July at Roseworthy from 7.30pm.

Caroline Rhodes - GPSA: Current status on the GM moratorium in SA, and Grains Blueprint announcement.

Darren Ray - Bureau of Meteorology - Seasonal outlook for 2019, discussion regarding alternate weather forecasting.

This meeting will be webcast to ensure wide access to members.
(Voting can not be conducted via Zoom webcast, so in order to vote you will need to be present at the venue).

Zoom meeting details;
Meeting ID: 456 455 515 https://zoom.us/j/456455515
find your local number: https://zoom.us/u/aEZVyu4ds

Keep reading for the latest exciting Newsletter showcasing some young new minds in the agricultural research community

For your interest - have a look at this website **Adelaide AgTech Meetup Group** for new groups, events and other opportunities and solutions in the agricultural area

https://www.meetup.com/en-AU/Adelaide-AgTech-Meetup/

Crop Science Society of SA
Annual General Meeting
17th of July 2019, 7:30pm – Richardson Theatre, Roseworthy Campus

AGENDA

1. Present
2. Apologies
3. Confirmation of the minutes from previous meeting held 18/7/18
    - 3. A. Business arising from minutes
- The Presidents report
- The Treasurers report
    - 5. A. Consideration of the accounts and reports of the committee & auditors report (if required)
- Secretary's Report
- Election of Committee members (non-election year for office Bearers).
- The appointment of Auditors
- Other business
    - Administration position.
    - New Honorary Award in recognition of John Both.
    - Life Membership considerations
    - Duncan Correll Travel Award - Applications
    - Meeting timing/Attendance
    - Subscriptions
    - Constitution approved after consultation
    - Tony Rathjen Newsletter prize
- Committee structure and election of officers

Member in focus - Craig Davis

As current president of the Crop Science Society I welcome this new addition to our regular newsletter. Each newsletter I will be asking a member to provide a few paragraphs about themselves and what they do so we can all get to know a little more about each of them. Initially it will be about our organising committee, but in time we will ask regular members for an opportunity to contribute.

Personally, I have over 15 years of experience in Agronomy and presently deliver fee for service consultancy to broadacre clients across the Lower & Mid North and the Yorke Peninsula.

After completing my B. Ag. Sc degree at the University of Adelaide (Waite) in 2001 I have continued industry accreditation through many programs and always enjoy industry workshops, conferences & training opportunities.

I particularly enjoy seeding time as it is generally more planned and with less stress than harvest, but obviously harvest is the more rewarding period where we get to (hopefully) enjoy the fruits of our labour.

The seasonality of cropping means we have a much quieter time over summer, and Melissa and I enjoy taking the kids away for a relaxing time at the beach or camping.

In recent years I have begun to get more politically motivated and relish in the opportunity for a good discussion on local, state & federal matters. I see the opportunity to help provide a better future for us all to enjoy and see this kind of contribution as a part we can all play. Twitter has been good and bad for facilitating this, and often I have questioned whether I should walk away from it and close my account (as I did with Facebook some years ago). For now though, the farming and Ag connectivity of Twitter keeps me attached.

Crop Science has been a fantastic means of regular networking and industry connectedness. I would like to think that in 30 years the next generation of Agro's, researchers & farmers could enjoy it as I have been able to.

Craig Davis.

Field pea mixed variety canopy management

Authors: Jade Rose (Hart Field-Site Group), Sarah Day and Penny Roberts (SARDI)

Background

Ascochyta blight (commonly known as blackspot) is a disease affecting field pea in South Australia. It can cause severe yield loss and reduce grain quality. The disease is caused by a complex of four pathogens (*Didymella pinodes* (synonym: *Mycosphaerella pinodes)*, *Phoma medicaginis var. pinodella*, *Phoma koolunga* and *Didymella pisi*). Symptoms (Figure 1) include irregular, dark-brown necrotic spots on all foliar parts of the plant, including the leaves, stem and pods. Blackspot can be spread by seed, soil or survive in field pea stubble. Spores produced by the pathogen on field pea stubble can be carried via wind or rain-splash during wet weather. During rain events the disease can spread rapidly as spores are transferred onto adjacent healthy plants. Sowing infected seed is also a method of disease transfer, which is influenced by seasonal and soil conditions. In wet seasons, economic losses can occur, with individual crop losses as high as 45 percent reported. However, in dry seasons crop losses to blackspot are low.

Currently there are no resistant field pea varieties commercially available for farmers to grow. Management options for blackspot include fungicide sprays, hygiene, and crop rotation. Breeding resistance into varieties is a slow process and due to the complex nature of resistance and low investment in this area. A need for improved management tools to reduce yield losses due to blackspot are needed.

Conventional field pea which have leaflets on the tendrils (e.g. PBA Oura and Percy) are known for their weed suppression, and yield stability in the presence of weeds. Semi leafless field peas have less leaflets and more tendrils (e.g. PBA Wharton). They are known for their high yield potential in the absence of weeds, and lodging resistance due to less biomass production. Variety mixtures and their effect on yield and weed suppression may be affected by both the mixing ratio of the varieties and the sowing density.

Variety mixes may improve the ability of field pea to reduce fungal disease spread, and maintain yields. Variety mixtures with differing disease resistance levels could also help manage plant disease in terms of reducing fungicide inputs. The impact of canopy architecture on rain-splash dispersal and crop microclimate is also an important factor affecting disease spread.

Figure 1. Blackspot infection on field pea leaves (left) and stem (right)

Methods

This season at Hart, field pea varieties have been sown alone and in different seeding rate combinations. The trial is replicated and include PBA Oura, PBA Percy, PBA Wharton and a breeding line (Table 1). The trial was sown on the 16^{th} of May, targeting plant population of 45 plants per m^2 for conventional peas and 55 plants per m^2 for semi-leafless peas. Seed was treated with P-Pickle T.

Throughout the season, fortnightly fungicide sprays will be applied to half the trial in order to assess the level of disease infection in different field pea canopy structures. These sprays commenced on the 5^{th} of June before blackspot infection had occurred. A number of measurements will be taken in-season, such as plant establishment counts, plant height, lodging, normalised difference vegetation index (NDVI), canopy temperature and humidity, canopy closure date, grain yield and disease scores.

Table 1. Field pea variety combinations and treatments

	Treatments:	
1	50% PBA Oura + 50% PBA Percy (conventional)	
2	25% PBA Oura + 75% PBA Percy	
3	75% PBA Oura + 25% PBA Percy	
4	100% PBA Oura	
5	100% PBA Percy	
6	50% PBA Wharton + 50% breeding line (semi-leafless)	
7	25% PBA Wharton + 75% breeding line	
8	75% PBA Wharton + 25% breeding line	
9	100% PBA Wharton	
10	100% breeding line	
11	PBA Percy + canola x2	
12	PBA Oura + canola x2	

Summary

If you want to follow the progress of the trial it will be on the program at the Hart Field Day (September 17^{th} 2019) and in the 2019 Hart Trial Results book.

Further information

Jade Rose – Hart Field-Site group

jade@hartfieldsite.org.au, 0448866865

Sarah Day – SARDI

Sarah.Day@sa.gov.au, 08 8842 2404

Penny Roberts – SARDI

Penny.Roberts@sa.gov.au

Cereal Pathology 2019 Season Update

Tara Garrard and Hugh Wallwork - SARDI

Septoria Tritici Blotch (STB)

Septoria primary infection is from ascospore release carried by wind early in the season and puts early sown wheat at risk of infection regardless of the previous cropping history. Wheat on wheat rotations in stubble retention systems are also at high risk of infection. Septoria has a long latency period and symptoms could take 40 days to develop in cool conditions. Therefore continual crop monitoring in wheat paddocks is essential to catch the disease early if it occurs.

Symptoms can only be confirmed as Septoria if pycnidia (small black dots) are present within the lesion. Secondary infection occurs from theses lesions on the leaves via rain splash. Therefore once Septoria symptoms are observed an early spray can effectively manage inoculum levels.

If you are unsure about symptoms samples can be sent to SARDI for diagnosis. Table 1 provides a summary of wheat variety disease resistance ratings for Septoria.

Table 1: Disease resistance ratings for Septoria tritici blotch

Variety	Resistance rating
Arrow	S
Beckom	S
Chief CLPlus	MS
Cobra	MS
Corack	S
Cutlass	MSS
DS Bennett	MSS
DS Darwin	S
DS Pascal	MS
Emu Rock	SVS
Forrest	MS
Grenade CL Plus	S
Havoc	MSS
Illabo	MSS
Impala	VS
Kittyhawk	MRMS
Kiora	MS
Kord CL Plus	MS
Longsword	MSS
Mace	S
Manning	MR
Orion	MRMS
Razor CL Plus	SVS
Revenue	S
RGT Accroc	MS
Scepter	S
Sheriff CLPlus	S
Trojan	MS
Vixen	S
Wyalkatchem	S
Yitpi	MSS

Wheat Powdery Mildew

Powdery mildew levels have been increasing and growers should keep an eye out for symptoms as they can begin to develop in the lower canopy on the stems and leaves. Spraying before canopy closure is essential in gaining effective disease control.

Previous screening suggested the variety Chief CL Plus had good resistance. (RMR) In 2018 however severe disease symptoms in a crop of Chief CL Plus on the York Peninsula indicated there was virulence in the powdery mildew population

SARDI has now developed adult plant screening methods in controlled environments so that variety testing can be carried out using specific field collected isolates of the fungus. An updated variety disease resistance rating table was published in the 2019 Cereal Variety Disease Guide and is attached below (Table 2). If you see severe disease symptoms on any varieties which are currently suggested to have resistance please send a sample to SARDI.

Figure 1: Powdery mildew symptoms on the lower canopy in Chief CL

Table 2: Disease resistance ratings for Powdery mildew

Wheat	Powdery mildew
Arrow	SVS
Beckom	MSS
Chief CLPlus	SVS
Cobra	MSS
Corack	SVS
Cutlass	MSS
DS Bennett	R
DS Darwin	MS
DS Pascal	R
Emu Rock	MSS
Forrest	S
Grenade CL Plus	MSS
Havoc	S

Illabo	MRMS
Impala	R
Kittyhawk	MS
Kiora	MS
Kord CL Plus	MS
Longsword	MS
Mace	MSS
Manning	MS
Orion	SVS
Razor CL Plus	MSS
Revenue	R
RGT Accroc	MRMS
Scepter	SVS
Sheriff CLPlus	SVS
Trojan	S
Vixen	SVS
Wyalkatchem	SVS
Yitpi	MS

Barley Net Form Net Blotch (NFNB)

Despite low disease levels in the 2018 season disease symptoms can develop rapidly under the right climatic conditions and early sown paddocks are at higher risk. The pathogen has a high level of variability so resistance ratings may vary considerably between regions. SARDI is collecting isolates from across the state to monitor the variability and are asking for growers to send samples throughout the season.

Monitoring from the 2018 season has shown that Scope continues to demonstrate very good resistance to NFNB. Rosalind is also displaying good resistance in results so far (Table 3). Virulence on varieties RGT Planet, Compass and Spartacus CL are continuing to develop. A number of new varieties are displaying clear susceptibility so caution is to be taken in selecting these varieties. Virulence on Banks has been observed from one site in the South-East and would be expected to spread if the variety was widely grown.

Table 3: Net form net blotch isolates from SA in 2018 tested on 24 barley varieties

Isolate	49/18	50/18	51/18	52/18	21/18	47/18	25/18a	69/18	70/18	71/18	75/18	73/18a	76/18	72/18a
Host	Keel	RGT Planet	Topstart	RGT Planet	RGT Planet	RGT Planet	Keel	Gairdner	La Trobe	Compass	Rosalind	Westminster	Oxford	Fatima
	Elliston	Elliston	Wanilla	Wanilla	Yeelanna	Yallunda Flat	Brentwood	Conmurra	Conmurra	Conmurra	Rendelshem	Rendelshem	Rendelshem	Rendelshem
Clipper	3	4	3	2	4	3	2	3	4	4	3	2	2a	2
Schooner	4	3	2	3	4	2	2	3	2	4	2	2	3+	2
Scope	2	2	2	2	2	2	2	2	2	3	2	2	2+	2
SloopSA	2a	2a	2a	2a	5	2	2	2	2	2	3	2	2	2
Alestar	3	5	8	3	7	5	4	3	3	3	7	8	8	7
Banks	2	1	2	1	2	1	2	6	1	2	2	2	2	2
Commander	7	6	5	6	8	4	9	6	5	7	4	3	9	6
Compass	6	7	7	7	7	3	7	4	5	6	5	4	7+	6
Fathom	6	7	7	8	7	4	8	7	3	7	7	5	8	5
Fleet	1	1	1	1	1	2	3	3	2	2	2	4	2	2
RGT Planet	3	4	7+	3	9	5	4	3	3	6	7	7	8	8
Maritime	2	2	2	2	2	2	3	2	2	2	3	2	2	2
Navigator	7	7	8	7	7	5	6	7	5	8	8	7	8	8
Oxford	3	3	8	4	9	5	3	4	4	6	7	8	9	9
Rosalind	2	2	3	2	4	2	2	2	2	2	3	2	4	3
Spartacus	6	6	7	5t	3	4	8	3t	3	6t	3t	3	7t	7
Traveller	2	3	7	3	5	6	2	1	2	4	7	7	6	8
Westminster	3	2	5	2	6	4	2	4	2	3	7	5	5	7
IGB1705T	5	4	7	4	3	3	4	2	2	3+	3	5	4	4
WI4952	4	4	5	5t	4	2	5	2	2	3	2	4	3	6
Leabrook	7	7	5	7	7	5	8	5	5	7	4	5	4	7
Biere	5	4	9	4	7	7	6	4	4	8	5	7	9	7
Charles	8	8	8	7	7	5	7	3	3	4	8	8	7	8
Sunshine	7	6	7	5	8	6	5	4	5	7	7	8	6	8

Ramularia Leaf Spot – Barley

Ramularia collo-cygni is a barley foliar pathogen which is now confirmed to be present in Tasmania and Western Australia. There are yet to be any detections in South Australia but growers should be monitoring for disease symptoms, particularly in high rainfall zones. Ramularia lesions are typically reddish brown and rectangular shaped surrounded by a yellow ring.

Disease symptoms are expected to appear late in the season (around flowering) and develop rapidly. Spores can be spread either via the seed or wind.

More information about the disease can be found in the Ground Cover article published earlier this year: https://groundcover.grdc.com.au/story/5880911/ramularia-remains-a-barley-threat-in-2019/

Figure 2: Ramularia leaf spot lesions on barley leaf (Photo credit: Neil Havis, Scotland's Rural College)

Detection of emerging pulse root diseases in South Australia

SARDI is conducting a survey funded by SAGIT to investigate pulse root diseases emerging in South Australia following the failure of several pulse crops in 2017 with suspected root disease issues. The survey is using molecular techniques to assess the prevalence and distribution of known soil-borne pulse root pathogens and to detect the occurrences of new pathogens.

The SARDI Molecular Diagnostic Centre have 22 real time PCR tests developed for the detection of known pulse pathogens, these are listed in table 4. From the pests and pathogens currently assessed by the pulse test panel, *Pratylenchus neglectus*, *Pythium* clade F and *Didymella pinodes/Phoma pinodella* were the most prevalent in the samples analysed. *Rhizoctonia solani* AG8 and 2.1, *Pythium* clade I and *Macrophomina phaseolina* were also present at significant levels. *Aphanomyces euteiches* was found in 18% of samples, all from faba bean crops experiencing moderate to severe root rot symptoms.

For the detection of potential new pathogens and pathogens which do not yet have a PCR test developed Next Generation Sequencing (NGS) was used. The results so far have detected multiple species of

Phytophthora and *Fusarium*, which could be potential pathogens on pulse crops. The *Phytophthora megasperma* PCR test was developed based on the NGS results and is now available as part of the PCR test panel. This pathogen has been detected in 22% of samples which have been processed so far.

The survey is continuing in the 2019 and 2020 growing seasons and growers and agronomists are encouraged to send samples to SARDI if soil-borne disease issues are suspected in pulse crops.

Table 4: SARDI's Pulse Research Test Panel

No.	Target species	No.	Target species
1	Aphanomyces euteiches,	12	Phytophthora clandestina
2	Aphanomyces trifolii	13	P. medicaginis
3	Didymella pinodes/ Phoma pinodella	14	P. megasperma
4	Ditylenchus dipsaci	15	Pratylenchus neglectus
5	Rhizoctonia solani AG2.1	16	P. thornei
6	R. solani AG2.2	17	P. quasitereoides
7	R. solani AG4	18	P. penetrans
8	R. solani AG8	19	Pythium clade f
9	Leptosphaeria maculans	20	Pythium clade I
10	Macrophomina phaseolina	21	Sclerotinia sclerotiorum
11	Phoma rabiei	22	Thielaviopsis basicola

Contacts:

Dr Tara Garrard
0459 899 321
Tara.garrard@sa.gov.au

Dr Hugh Wallwork
0427 001 568
Hugh.wallwork@sa.gov.au

SARDI Field Crops Pathology
Locked Bag 100
Glen Osmond
SA
5064

The genetics and biology of cereal cyst nematode in wheat

Kara A Levin, Matthew R Tucker, Diane E Mather

School of Agriculture Food and Wine, Waite Campus, University of Adelaide

Cereal Cyst Nematode

Cereal cyst nematodes (CCN) establish feeding sites deep within the root vascular tissue. They divert water and nutrients from the host plant to serve their own needs and can reduce wheat yield by up to 80%. These parasites once caused devastating losses in southern Australia, but these have been greatly reduced thanks to research outputs (soil diagnostic tools and resistant varieties) that have been widely adopted by growers. Resistance loci have been genetically mapped, but the causal genes and mechanisms of the resistance are not known. One of the resistance loci in wheat, *Cre8,* is thought to affect both resistance and tolerance to CCN.

Research Approach

Staying ahead of CCN is important, as nematode populations change and overcome plant resistance mechanisms. The focus of this PhD project was to identify the causal gene at the *Cre8* locus and better understand the mechanism of resistance. To isolate the effect of *Cre8*, two Trident/Molineux doubled haploid lines were selected, TMDH006 with the resistance allele at *Cre8* and the TMDH082 with no known resistance alleles. These lines were crossed with each other and progeny were self-pollinated for several generations. In each generation, progeny were tested with DNA markers near *Cre8* to select heterozygotes that could provide new genetic recombination in future generations. In the F_5 generation, a pair of near-isogenic lines (NIL) was selected. These NILs, which differ at *Cre8* but are similar elsewhere in the genome, were used to study the effects of the *Cre8* locus.

Genetics: Fine-Mapping *Cre8*

To narrow down the region of *Cre8*, a fine-mapping approach was used. Seeds that had been determined to be homozygous for genetic recombination in the region, were put into inoculated trials. Trials were run using a tube test developed by SARDI, with counting of white cysts on roots after 12 weeks (Fig. 2A). With analysis of the outcome of each trial in combination with genotypic data, the region of interest was narrowed. Through seven generations of marker genotyping and five years of resistance testing of TMDH006/TMDH082 progeny plants, *Cre8* was mapped to an interval of less than 1 cM between markers *wri392* and *wri430* (Fig. 2B). This region on 6B is estimated to be around 880 kbp with 17 high-confidence genes. From these genes, seven of them are known to be expressed in root tissue. These genes are being reviewed as possible candidates for *Cre8*.

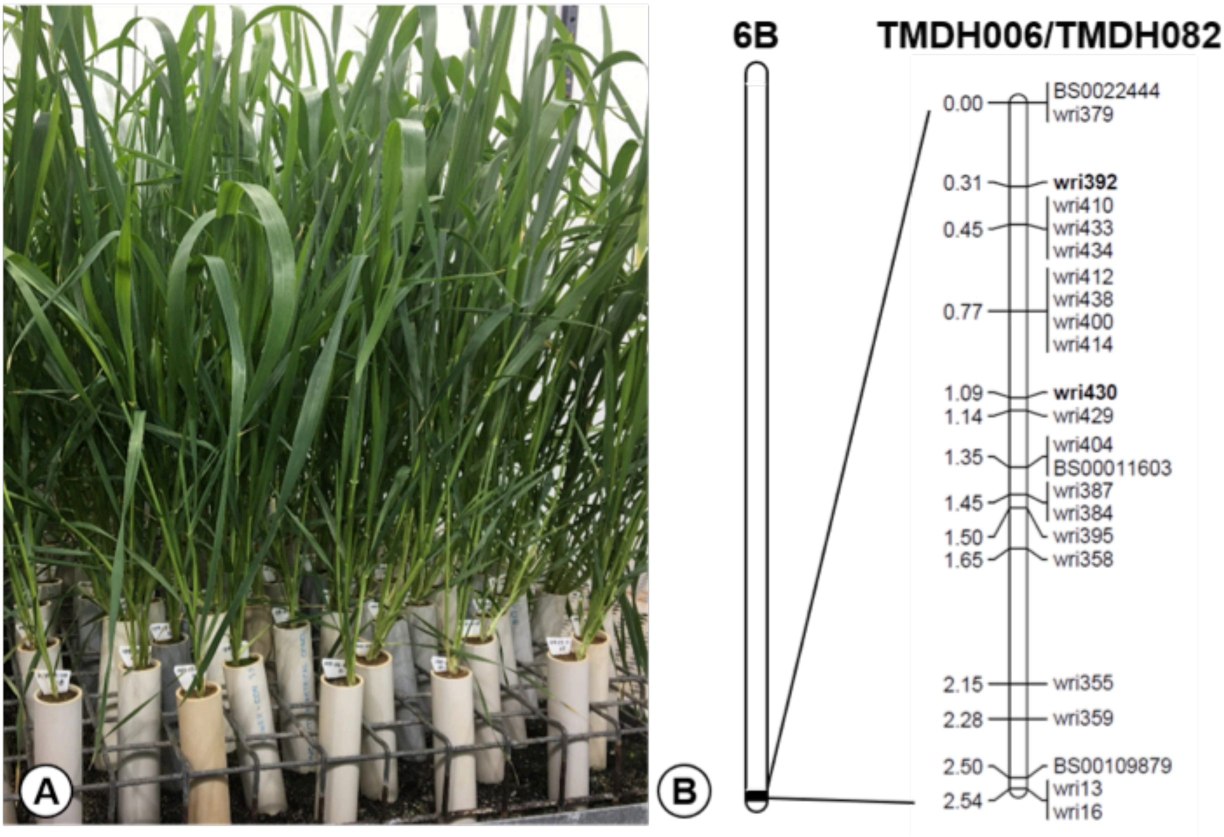

Figure 1: Fine-mapping of the *Cre8* locus. **A**) Phenotyping for CCN resistance carried out in a controlled environment room using a SARDI tube test. **B**) *Cre8* has been fine-mapped to the end of chromosome 6B on a region that is approximately 880 kbp. Bold markers indicate the flanking markers of *Cre8* region.

Biology: Effects of CCN and *Cre8*

To investigate the mechanism of resistance, nematode feeding sites in both resistant and susceptible plants were observed using microscopy. In order to better understand the formation of feeding sites, a new method was developed to generate 3D images of root tissue. The process involved incubating root samples with a clearing agent (ClearSee), cutting thick sections through the feeding site and imaging both sides of the section to increase depth. This provided high definition images of feeding sites and the root vascular system.

Using this method, a striking change was discovered in the anatomy of the central metaxylem (cMX), a main conduit for water transport from root to shoot. In control (non-inoculated) wheat roots, the cMX appeared as long hollow tubes (Fig. 2A). In infected roots, the cMX appeared distorted with short wide 'bubble'-like cells (Fig. 2B). It is hypothesised that the nematode inhibits cell elongation and cell maturation. Cells that are kept alive in this way may later become part of the feeding site and contribute to the nutrient supply for the nematodes.

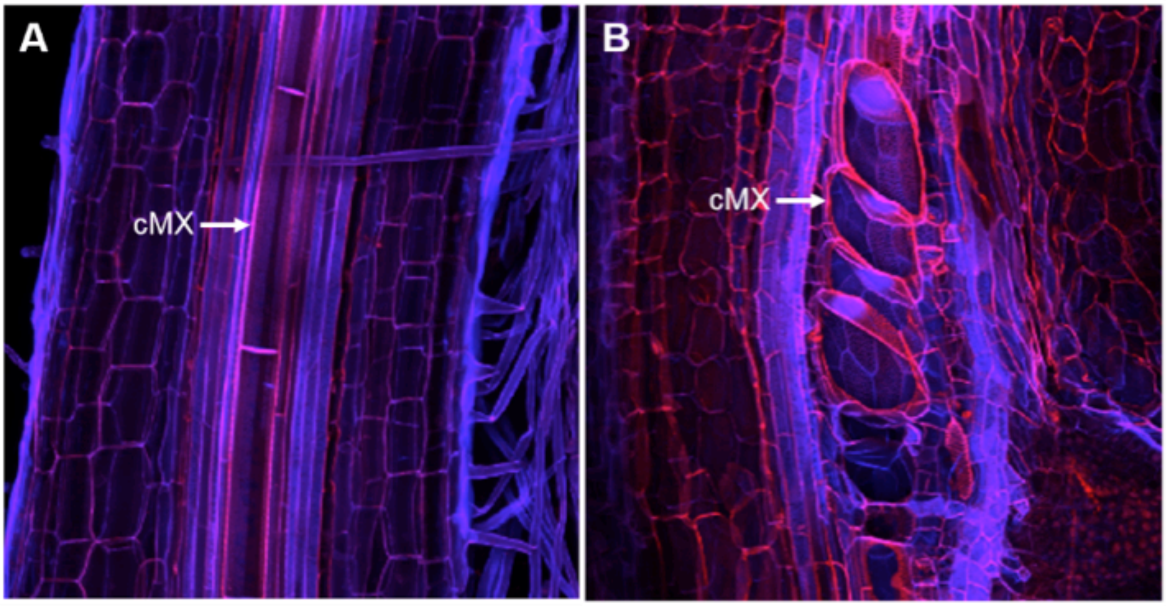

Figure 2: Longitudinal sections of a wheat root shows striking differences in the central metaxylem (cMX) of a **A**) control (uninfected) root and **B**) cereal cyst nematode (CCN)-infected root 7 DAI (days after inoculation).

Feeding sites developed in both the susceptible and resistant NILs, but there were some subtle differences between them. It was observed that CCN feeding sites in the resistant-NIL (R-NIL) were usually found in the outer part of the vascular bundle, away from the cMX (Fig. 3A) while feeding sites in the susceptible-NIL (S-NIL) were almost always found adjacent to cMX cells (Fig. 3B). Longitudinal section further revealed that feeding sites in the R-NIL were separate from cMX cells, rarely invading these cells (Fig. 3C). Conversely, in the S-NIL, the feeding sites and cMX were almost always connected, providing larger feeding sites (Fig. 3D).

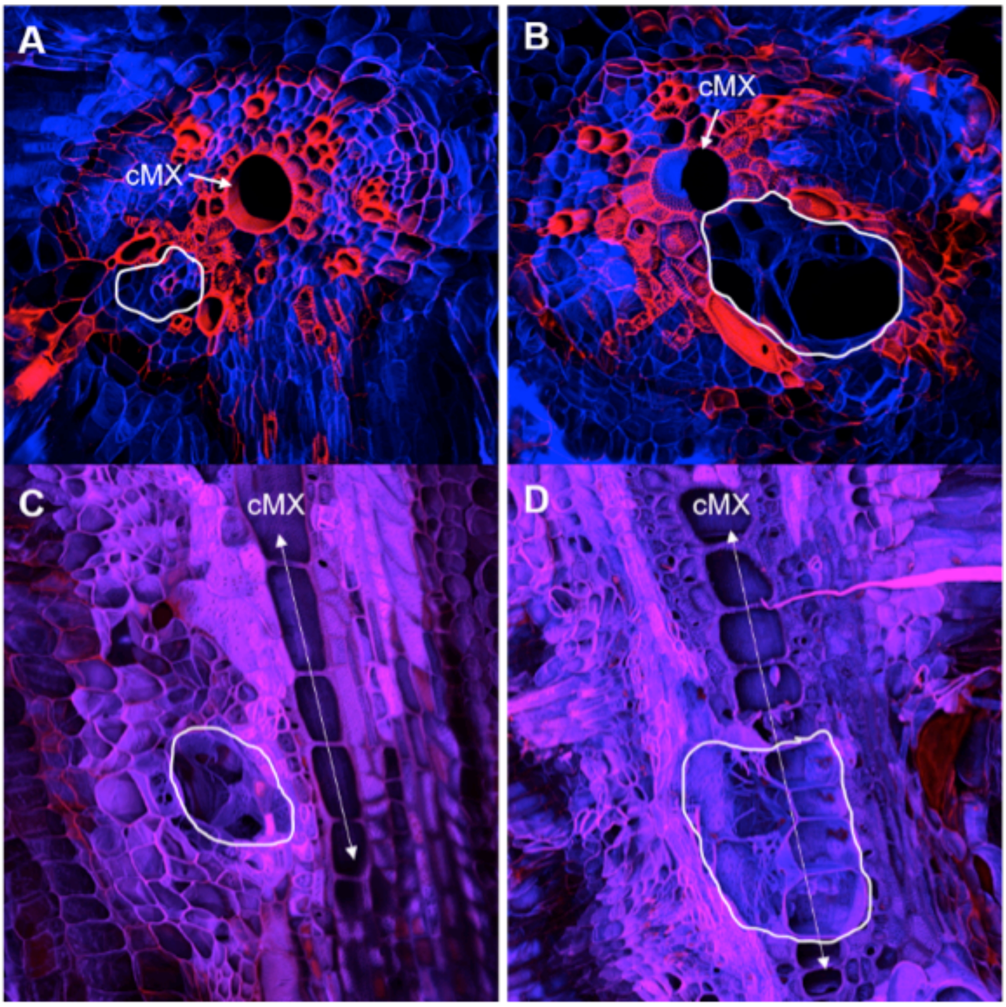

Figure 3: Feeding sites observed in (**A,C**) resistant and (**C,D**) susceptible near-isogenic lines (NILs) in (**A,B**) transverse root sections stained with (red) basic fuchsin and (blue) calcofluor white and (**C,D**) longitudinal root sections stained with (red) propidium iodide and (blue) calcofluor white. cMX (central metaxylem), feeding site (outline in white)

Summary

Cereal cyst nematode is successfully controlled in Australia by resistant cultivars. The research done in this project has narrowed the genetic region that contains the resistance locus *Cre8* and identified seven candidate genes. In parallel to this, comparisons of feeding site development between resistant and susceptible plants indicate that the *Cre8* resistance mechanism may prevent CCN from deeply penetrating the vascular tissue and invading the cMX. The discovery within the vascular tissue provides new insights into the 'strategies' used by CCN to secure water and nutrients and those used by wheat plants to survive infection. These are relevant not just to plant-nematode interactions but also to water and nutrient transport and stress responses in general.

Acknowledgments

We thank the Grains Research and Development Corporation for financial support, the University of Adelaide for a Beacon Scholarship and John Lewis of the South Australia Research and Development Institute for expert advice and assistance.

The Crop Science Society of SA
P.M.B. No.1
GLEN OSMOND SA 5064, AUSTRALIA

Mr Anthony Beasley
Secretary to the Committee
Anthony.beasley@parliament.sa.gov.au

C/O Parliament House
GPO Box 572
Adelaide SA 5001

11th April 2019

Copies to;
Tim Whetsone – Minister for Primary Industries & Regional Development
John Darley – Member of the MLC

Select committee on moratorium on the cultivation of genetically modified crops in South Australia.

The need for a balanced view of science.

Since 1975 the Crop Science Society of South Australia Incorporated (CSSSA) has advocated for the use of sound science to provide improvements in agricultural crop production for South Australian producers. CSSSA is an active organisation of farmers, farming consultants and agricultural research scientists. It was felt that a society was needed to provide a forum for the exchange of information between people in academic and applied fields; between research, teaching, extension workers, farmers and marketing representatives.

CSSSA provides a forum for the interchange of ideas from a membership extending beyond that spanned by any existing organisation. Currently, the society has approximately 400 members from rural and metropolitan SA, as well as a small interstate membership. Meetings are held on the third or fourth Wednesday of the month at the University of Adelaide's Roseworthy campus.

In recent years under the previous government, policy has hampered progress of Agricultural science in this state, and the flow on effect has the potential to hinder the broader agricultural community. This has been ignored in favour of a populist view.

The benefits to the SA economy, environment & farmers from Genetically Modified (GM) technology could be substantial. Not only through improved yields but through reduced farm chemical use and adoption of more sustainable farming practices.

Currently consumers, feedlotters and processors can legally import (into SA) and manufacture from GM products. These products are widely available on supermarket shelves. Furthermore, after over 30 years of global, and Australian GM food and fibre production, the global science has proven GM technology is safe. In addition, GM crops have successfully co-existed with conventional farming systems and identity preserved crops.

Since the inception of the moratorium, and subsequent extension, the state has seen applications for sites to undertake GM research and studies dwindle. This is hampering the scientific development of Agriculture in SA – once a state that led Agricultural development. This may further lead to a reduction in trials and research conducted to determine the safety of newer GM technology – which may also disadvantage consumers and the public at large.

The use of GM and emerging technologies for crop breeding to better manage these present and apparent risks is a must for the industry and society. GM crops can assist in the creation of a sustainable future through improved crop production, environmental health and a reduction of pesticide applied in the environment. The acceptance of GM technology will also ensure farmers have all the available tools to produce food and fibre crops sustainably and competitively into the future.

There is a common misunderstanding that large multinational companies are the only businesses conducting GM research and development. The fact is there are hundreds of government & university based programs that conduct GM research & development, and much of this will make it to market. One particular examples from Australia is the Omega-3 GM canola developed right here by the CSIRO (in collaboration with the Grains Research Development Coorporation (GRDC) and marketed through Nu-Seed). The fact is though, that due to stringent and expensive regulations required, the main companies that can afford to commercialise & deliver this technology are the large-multinationals. This does not preclude industry development, and in fact prebreeding investments in a range of grain crops by the GRDC will certainly include GM technology – this would be another direct farmer investment into GM technology – for grower's direct benefit.

Farmers are not forced to use a particular technology or practice, unless legislated to do so. Farmers, like other business owners & managers typically choose to make decisions based on evidence based testing until it is proven. Investment by organisations such as the SA Grains Industry Trust (SAGIT) & the GRDC doesn't give instant green light to a practice change. Therefore, why would anyone consider an investment in research or development (like Omega-3 canola) by these organisations as "forcing" GM technology onto farmers. Farmers can continue to make personal & business decisions to use or not to use technology or practices, and GM will be no different. Farmers will not be slaves to GM technology – it is merely another tool they need to have available to them.

We invite you to attend a Crop Science Society meeting if you need to further gauge the sentiment of the agricultural industries affected by this legislation.

Kind regards,

CDavis

Craig Davis.

Reducing Limitations to Pulse Production

Thursday 22 August 2019

Join the Hart Field-Site Group at three Mid-North sites to learn more about growing pulses this season.

Willowie - Session Begins 10am
Low rainfall break crops and machinery demonstration

Wirrabara - Session Begins 12.30pm
Nitrogen fixation and acid tolerant rhizobia in acidic soils

Bute - Session Begins 3.15pm
Weed management in high break crop intensity farming systems

HART
SA's premier cropping field site

Attend all three sessions or just one, it's up to you.
A free bus (ex Clare Town Oval) is available for those who wish to visit all three sites.
Lunch will be provided, seats are limited and will require RSVP prior to the event.

If you have questions or would like to register your interest in attending, please contact Sandy Kimber on 0427 423 154 or visit http://www.hartfieldsite.org.au/pages/events/other-events.

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This event is part of the GRDC Southern Pulse Extension Project, hosted by Hart Field Site Group